WHAT IS CLAIMED IS:

1. A power train for a motor vehicle, said power train comprising a combustion engine with a driving shaft turning at a first rpm rate, at least one torque-coupling device, a transmission with a transmission input shaft, and at least one electro-mechanical energy converter with an energy-converter shaft turning at a second rpm rate, said electro-mechanical energy converter being operable at least as a motor and as a generator and having an interactive rotary connection to the driving shaft; wherein the interactive rotary connection has at least two rpm ratios defined as quotients of the first rpm rate divided by the second rpm rate, and wherein the at least two rpm ratios automatically set themselves according to which of at least two operating modes the electro-mechanical energy converter is working in, said at least two operating modes comprising a start-up mode and a driving mode.

2. The power train of claim 1, wherein the driving shaft has a rear end facing towards the transmission and the interactive rotary connection is arranged at said rear end, and wherein further the transmission input shaft can be coupled to and uncoupled from the driving shaft by means of the at least one torque-coupling device.

3. The power train of claim 1, wherein the driving shaft has a front end facing away from the transmission and the interactive rotary connection is arranged at said front end.

4. The power train of claim 1, wherein the driving shaft has a first rotary axis and the electro-mechanical energy converter has a second rotary axis, and wherein said first and second rotary axes are substantially parallel to each other.

5. The power train of claim 1, wherein the interactive rotary connection comprises at least a pair of sheaves and an endless-loop device coupling the sheaves to each other by frictional contact.

6. The power train of claim 5, wherein each sheave comprises a belt-drive pulley and the endless-loop device comprises a belt.

7. The power train of claim 5, wherein each sheave comprises a pair of conical discs and the endless-loop device comprises a chain.

8. The power train of claim 7, wherein the conical discs of each pair can be set at a variable axial distance from each other, thereby varying the radius of a contact circle where

the chain is held between the conical discs, so that any rpm ratio within a continuous range can be set between the pairs of discs.

9. The power train of claim 1, wherein the interactive rotary connection comprises at least one gear pair.

10. The power train of claim 1, wherein the electro-mechanical energy converter serves as a starter motor for the combustion engine.

11. The power train of claim 1, wherein the electro-mechanical energy converter is used to propel the motor vehicle.

12. The power train of claim 1, wherein during a start-up phase of the combustion engine the second rpm rate is higher than the first rpm rate.

13. The power train of claim 12, wherein the rpm ratio for the start-up phase is between 2:3 and 1:10.

14. The power train of claim 1, wherein under a first mode of the at least two operating modes the torque flows from the electro-mechanical energy converter to the combustion engine, and under a second mode of the at least two operating

modes the torque flows from the combustion engine to the electro-mechanical energy converter.

15. The power train of claim 14, wherein the rpm ratio for the first mode is smaller than the rpm ratio for the second mode.

16. The power train of claim 15, wherein the rpm ratio for the second mode is between 2:1 and 1:2 and is used to run the electro-mechanical energy converter in a generator mode.

17. The power train of claim 14, wherein the interactive rotary connection comprises at least one rotary transfer device arranged between the electro-mechanical energy converter and the combustion engine.

18. The power train of claim 17, wherein the at least one rotary transfer device comprises a planetary gear mechanism with at least one ring gear, at least one sun gear, and at least one planet carrier with at least one planet gear.

19. The power train of claim 17, wherein the at least one rotary transfer device comprises a gear mechanism with stationary gear shafts and at least two gear pairs.

20. The power train of claim 17, wherein the at least one rotary transfer device comprises at least two clutches for engaging and disengaging the different rpm ratios.

21. The power train of claim 20, wherein at least one of the at least two clutches is an overrunning clutch.

22. The power train of claim 21, wherein at least two of the at least two clutches are overrunning clutches.

23. The power train of claim 20, wherein at least one of the at least two clutches is a centrifugal clutch.

24. The power train of claim 20, wherein at least one of the at least two clutches is an electromagnetic clutch.

25. The power train of claim 17, wherein the interactive rotary connection further comprises at least one fixed-ratio rotary transfer stage.

26. The power train of claim 25, wherein the fixed ratio of the first divided by the second rpm rate is between 3:2 and 5:1.

27. The power train of claim 25, wherein the fixed-

ratio rotary transfer stage comprises a belt drive with pulleys of different diameters.

28. The power train of claim 25, wherein the fixed-ratio transfer stage comprises a gear pair.

29. The power train of claim 18, wherein the rotary transfer device comprises a housing and the at least one ring gear is connected and thereby rotationally coupled to the housing.

30. The power train of claim 17, wherein the at least one rotary transfer device further comprises a first clutch located in a first torque flow path that is operative under the first mode, and a second clutch located in a second torque flow path that is operative under the second mode, and wherein the first clutch is engaged in the first mode and disengaged in the second mode, while the second clutch is engaged in the second mode and disengaged in the first mode.

31. The power train of claim 30, wherein the first clutch and the second clutch are overrunning clutches.

32. The power train of claim 30, wherein the at least one rotary transfer device comprises a planetary gear mechanism

with a ring gear, a sun gear, and a planet carrier with at least one planet gear, wherein under the first mode the electro-mechanical energy converter drives the sun gear which, in turn, drives the planet carrier through the at least one planet gear, and the planet carrier drives the combustion engine; and wherein under the second mode, the combustion engine drives the planet carrier with the at least one planet gear which, in turn, drives the electro-mechanical energy converter through the sun gear.

33. The power train of claim 30, wherein the at least one rotary transfer device comprises a first gear pair and a second gear pair, wherein under the first mode the electro-mechanical energy converter drives the combustion engine through the first clutch and the first gear pair; and wherein under the second mode, the combustion engine drives the electro-mechanical energy converter through the second clutch and the second gear pair.

34. The power train of claim 30, wherein the rotary transfer device has first transfer elements that determine the first rpm ratio and wherein the first clutch is placed in the torque flow path at one of an upstream location and a downstream location relative to the first transfer elements.

35. The power train of claim 30, wherein the rotary transfer

transfer device has second transfer elements that determine the second rpm ratio and wherein the second clutch is placed in the torque flow path at one of an upstream location and a downstream location relative to the second transfer elements.

36. The power train of claim 17, wherein the rotary transfer device is arranged on one of the driving shaft and the transmission input shaft.

37. The power train of claim 17, wherein the electro-mechanical energy converter comprises a rotor and a stator, and the rotary transfer device is arranged radially inside the rotor.

38. The power train of claim 17, wherein the interactive rotary connection comprises a belt drive with a belt, and a first pulley connected to the combustion engine, and a second pulley connected to the electro-mechanical energy converter.

39. The power train of claim 38, wherein the rotary transfer device is arranged radially inside one of the first pulley and the second pulley.

40. The power train of claim 17, wherein the

transmission comprises the rotary transfer device.

41. The power train of claim 1, wherein the interactive rotary connection comprises a rotary vibration damping device with energy-storing elements allowing the driving shaft and the energy converter shaft to rotate in relation to each other within a limited range against an opposing torque of the energy-storing elements.

42. The power train of claim 1, wherein the interactive rotary connection comprises a rotary shock/vibration absorbing device.

43. The power train of claim 37, wherein at least one of a rotary vibration damping device and a rotary shock/vibration absorbing device is arranged radially inside one of a belt-drive pulley and the rotor.

44. The power train of claim 1, wherein at least one of a rotary vibration damping device and a rotary shock/vibration absorbing device is arranged on one of the driving shaft and the energy-converter shaft.

45. The power train of claim 18, wherein the ring gear, the planet gears, and the sun gear comprise a helical tooth

profile; wherein under the first mode, the helical tooth profile pushes the ring gear in a first axial direction where the ring gear becomes locked to a non-rotating component; and wherein under the second mode, the helical tooth profile pushes the ring gear in a second axial direction where the ring gear becomes locked to the planet carrier.

46. The power train of claim 18, wherein the rotary transfer device has a ratio-locking means which, at rpm rates exceeding those required for the start-up mode, prevents the rotary transfer device from shifting out of a first rpm ratio that is normally reserved for the start-up mode.

47. The power train of claim 46, wherein the ratio-locking means comprises at least one centrifugal body arranged at an external circumference of the planet carrier, and wherein a centrifugal force drives the centrifugal body into form-locking engagement with a recess at an internal circumference of the ring gear.

48. The power train of claim 47, wherein the at least one centrifugal body has a spherical shape.

49. The power train of claim 45, wherein the ring gear has axially engaging coupler means for coupling the ring gear to

one of the non-rotating component and the planet carrier.

50. The power train of claim 49, wherein the coupler means comprise at least one of a Hirth coupler, a dog clutch, and a friction clutch.

51. The power train of claim 17, wherein the rotary transfer device has a housing and the combustion engine has an engine housing, and wherein the housing is fixedly attached to the engine housing.

52. The power train of claim 17, wherein the interactive rotary connection further comprises a belt drive with a belt and the rotary transfer device comprises a housing.

53. The power train of claim 52, wherein the housing comprises a lever arm carrying a belt-tensioning means, the housing being rotatably supported on one of the driving shaft and the energy-converter shaft, and wherein the housing is constrained to a rotary range of less than a full turn by the belt-tensioning means bearing against the belt.

54. The power train of claim 53, wherein the belt-tensioning means is set to provide a base amount of belt tension, and wherein a torque-dependent amount of belt tension

is superimposed on said base amount.

55. The power train of claim 53, wherein said rotatable support comprises a bearing, and wherein said bearing is arranged in a plane defined by the belt.

56. The power train of claim 52, wherein the interactive rotary connection further comprises a belt pulley rotatably supported by a belt-pulley bearing on one of the driving shaft and the energy-converter shaft, and wherein said belt-pulley bearing is arranged in a plane defined by the belt.

57. The power train of claim 52; wherein the housing is rotatably supported on the driving shaft; wherein the housing, in turn, rotatably supports a first pulley on a first pulley shaft that is offset from the driving shaft; wherein the rotary transfer device is connected to the first pulley by way of a first gear that is rotationally constrained to the first pulley; and wherein the first pulley is connected by way of the belt to a second pulley mounted on the energy-converter shaft.

58. The power train of claim 52; wherein the housing is rotatably supported on the energy-converter shaft; wherein the housing, in turn, rotatably supports a second pulley on a second pulley shaft that is offset from the energy-converter shaft;

wherein the rotary transfer device is connected to the second pulley by way of a second gear that is rotationally constrained to the second pulley; and wherein the second pulley is connected by way of the belt to a first pulley mounted on the energy-converter shaft.

59. The power train of claim 52; wherein the rotary transfer device comprises a planetary gear mechanism with a sun gear, a planet carrier with at least one planet gear, and a ring gear.

60. The power train of claim 59; wherein the sun gear, the at least one planet gear, and the ring gear have helical tooth profiles; wherein the ring gear is axially movable to one side into engagement with the housing and to an opposite side into engagement with the planet carrier; and wherein said movement between the one side and the opposite side serves to shift the rotary transfer device between the at least two rpm ratios.

61. The power train of claim 52; wherein the housing is rotatably supported on the driving shaft; wherein the housing, in turn, rotatably supports a first pulley on a first pulley shaft that is offset from the driving shaft; wherein the rotary transfer device comprises a spur gear mechanism with two

gear pairs providing the at least two rpm ratios, each gear pair having a fixed gear solidly connected to the first pulley shaft and an overrunning gear supported on the driving shaft through an overrunning clutch; and wherein the overrunning clutches have opposite overrunning directions.

62. The power train of claim 52; wherein the housing is rotatably supported on the energy converter shaft; wherein the housing, in turn, rotatably supports a second pulley on a second pulley shaft that is offset from the energy converter shaft; wherein the rotary transfer device comprises a spur gear mechanism with two gear pairs providing the at least two rpm ratios, each gear pair having a fixed gear solidly connected to the second pulley shaft and an overrunning gear supported on the energy converter shaft through an overrunning clutch; and wherein the overrunning clutches have opposite overrunning directions.

63. The power train of claim 52; wherein the housing is rotatably supported on a first shaft comprising one of the driving shaft and the energy converter shaft; wherein the housing, in turn, rotatably supports a pulley on a pulley shaft: and wherein the pulley shaft is offset from the first shaft by a distance d which, for a given slack of the belt, is large enough to prevent the pulley shaft from swiveling by a full turn around

the first shaft.

64. The power train of claim 63; wherein the distance d is between 1 centimeter and 20 centimeters.

65. The power train of claim 52; wherein the rotary transfer device comprises two belt drives providing the at least two rpm ratios, each belt drive having a fixed pulley solidly connected to one of the driving shaft and the energy converter shaft and an overrunning pulley connected through an overrunning clutch to the other of the driving shaft and the energy converter shaft; and wherein the overrunning clutches have opposite overrunning directions.

66. The power train of claim 37; wherein the driving shaft has a front end facing away from the transmission and the electro-mechanical energy converter is arranged coaxially with the driving shaft at said front end; and wherein the rotary transfer device comprises an output element connected to the driving shaft and an input element connected to the rotor.

67. The power train of claim 18, wherein the electro-mechanical energy converter has a rotor, and wherein the planet carrier has a first torque-transmitting connection to the driving shaft and the sun gear has a second torque-transmitting

connection to the rotor.